

NON-PUBLIC?: N
ACCESSION #: 9204270473
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Peach Bottom Atomic Power Station - PAGE: 1 OF 4
Unit 3

DOCKET NUMBER: 05000278

TITLE: Reactor Scram Due to Stator Cooling Pump Trip and Improper
Generator Runback Timer Setting, and Failure to Perform Technical
Specification Surveillance
EVENT DATE: 03/06/90 LER #: 90-003-01 REPORT DATE: 04/16/92

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:
50.73(a)(2)(i), 50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: Albert A. Fulvio, Regulatory TELEPHONE: (717) 456-7014
Engineer

COMPONENT FAILURE DESCRIPTION:
CAUSE: SYSTEM: COMPONENT: MANUFACTURER:
REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT:

On March 6, 1990 at 0250 hours with Unit 3 operating at 100% power a reactor scram occurred due to a main turbine trip. The 'A' stator cooling pump tripped. The turbine tripped when the main generator loss of stator cooling runback trip timer timed out prematurely. The stator cooling pump tripped due to a sharp corner of the pump motor power lead lug wearing through its tape insulation and arcing from the pump motor power lead to ground. The trip timer had an improper setting due to a deficient test procedure.

During reactor cooldown on March 7, the bottom head drain and recirculation loop temperatures were not logged as required by Technical Specifications because the bottom head drain and recirculation loop

temperature indications were not considered to be representative of actual reactor coolant temperatures. Based on later reviews of thermocouple indications, reactor vessel pressure and temperature limits of Technical Specifications were not exceeded. No actual safety consequences occurred as a result of this event. The stator cooling

pumps have been repaired. The loss of Stator Coolant trip timer has been properly set. Procedure RT 5.40 was revised. An investigation of the bottom head drain flow problem was performed resulting in a highly successful cleaning effort during the cycle 8 refueling outage. No previous similar events were identified.

END OF ABSTRACT

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Requirements for the Report

This report is required per 10 CFR 50.73 (a)(2)(iv) because of an unplanned Engineered Safety Feature (Reactor Protection System (RPS) (EHS:JC)) Actuation, and per 10 CFR 50.73(a)(2)(i)(B) because of failure to perform a surveillance required by Technical Specifications.

Unit Conditions at Time of Event

Unit 3 was operating at 100% power. The 'B' stator cooling pump (EHS:TJ) was out of service for planned maintenance.

Description of Event

On March 6, 1990 Unit 3 was operating at 100% power. At 0247 hours the 'A' stator cooling pump tripped resulting in automatic trip of the 'A' and 'B' reactor recirculating water pumps (EHS:AD) and a main generator (EHS:EL) load runback. The 'A' and 'B' reactor feedwater pumps (RFP) ran back and were secured. Three minutes and eleven seconds after the stator cooling pump trip, the main turbine (EHS:TA) tripped. The RPS then initiated a reactor scram as designed upon receipt of the turbine stop valve closure signal. A Primary Containment Isolation System (PCIS) (EHS:JM) Group II and III actuation occurred as expected, due to void collapse upon insertion of control rods, when reactor water level decreased to the zero inch level (172 inches above the top of active fuel). Reactor level decreased to minus 5 inch level and was quickly restored using the 'C' RFP. At 0310 hours the PCIS actuations were reset. Erratic response of the 'C' RFP motor speed controller (EHS:JK) resulted in reaching a reactor level of plus 50 inches. Reactor level was then returned and maintained in the proper range of zero to plus 45

inches.

At 1100 hours reactor depressurization and cooldown was begun. Reactor depressurization continued until 0045 hours on March 7, 1990 when reactor pressure reached 20 psig.

The bottom head drain (EHS:CE) and recirculation loop temperatures were not logged during cooldown as required by Technical Specification 4.6.A.1 because the bottom head drain temperature was considered to be inaccurate (not representative of actual coolant temperature) and the recirculation pumps were not in use thus this data was not considered to be meaningful. However, these values are permanently recorded on strip chart recorders in the Control Room. The best available indication of reactor vessel temperature, reactor vessel shell thermocouples, were logged in lieu of the suspect values. The recirculation pumps were prohibited from operation by Technical Specification 3.6.A.5 because the difference between the dome and bottom head drain temperature was greater than 145 degrees F. Subsequent review of plant computer data recorded during cooldown indicated that the pressure vs. temperature limit of Technical Specification Figure 3.6.2 appeared to have been exceeded since the bottom head drain temperature is used to monitor this parameter. However, reactor vessel thermocouples monitoring the bottom head shell temperature indicated that the limit of Figure 3.6.2 had not been violated.

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Cause of the Event

The cause of the 'A' Stator cooling pump trip was wear of the 'B' phase pump motor (EHS:MO) power cable (EHS:JX) insulation (EHS:ISL) tape, due to personnel error, which resulted in arcing from the power lead. Maintenance was performed on this motor in September 1989. When the power leads were reconnected to the motor leads a sharp corner of the lug was inadvertently left with only a thin layer of tape insulation. Over time this corner wore through the tape and grounded against the inside of the terminal box. The other Unit 3 stator cooling pump motor and the Unit 2 'A' and 'B' motors were inspected satisfactorily. This is not considered to be a generic problem.

The cause of the main turbine trip was improper setting of the timer (EHS:TMR) which monitors main generator runback upon loss of stator cooling and which generates a turbine trip after 3.5 minutes if generator output is not less than 7,726 amps. The timer timed-out in 3 minutes 11 seconds. The cause of improper calibration of the timer setpoint was a deficient test procedure used to establish the setpoint.

The bottom head drain and recirculation loop temperatures were not logged as required by Technical Specification 4.6.A.1 because the bottom head drain temperature indication was considered to be inaccurate and recirculation loop temperatures were not considered representative of reactor coolant temperature since the recirculation pumps were not running. The recirculation pumps were prohibited from operation since the difference between reactor dome and indicated bottom head drain temperatures was greater than 145 degrees F. The errant bottom head drain temperature indication was due to insufficient flow through the bottom head drain line. The cause of the insufficient flow was due to a restriction of the Reactor Bottom head drain line. The restriction included metal shavings resulting from the recirculation pipe replacement during the previous refueling outage as well as other small parts accounted for in the loose parts analysis program.

Although Technical Specification 3.6.A.2 requires monitoring of bottom head drain and recirculation loop temperature, these indications were considered to have been misleading. The pressure vs. temperature limit of Technical Specification Figure 3.6.2 is not believed to have actually been violated because reactor vessel shell thermocouples in the bottom head region indicated temperatures as expected in compliance with the limit.

Analysis of the Event

No actual safety consequences occurred as a result of this event.

The RPS initiated a reactor scram as designed upon receipt of the turbine trip. Sufficient water level was maintained at all times following the scram to ensure adequate core cooling. Had the timer tripped in the proper length of time, 3.5 minutes, the turbine would not have tripped since stator cooling is not required when generator load is below 7,726 amps.

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Review of plant computer data recorded during cooldown indicated that the pressure vs. temperature limits of Technical Specification Figure 3.6.2 were exceeded due to insufficient flow in the bottom head drain. The curve in Figure 3.6.2 is a composite applicable to the entire vessel but for the observed phenomenon only the pressure vs. temperature curves for the bottom head region need be considered. General Electric Co. has evaluated this data for the bottom head area and concluded that the pressure vs. temperature limits for the bottom head were not violated. Therefore, there are no structural integrity concerns associated with

this event.

Insufficient flow through the bottom head drain line allowed the drain piping to cool rapidly and therefore the bottom head drain temperature sensor did not indicate a temperature representative of reactor coolant in the bottom head region. Reactor vessel shell temperatures recorded following the scram are more representative of the actual bottom head condition and indicate that coolant temperature was not actually as low as that indicated by the bottom head drain indication. Starting the 'A' recirculation pump resulted in the bottom head drain temperature indication promptly increasing and equalizing with the recirculation pump inlet temperature.

Corrective Actions

The 'A' and 'B' stator water cooling pumps have been repaired. This event was reviewed with appropriate maintenance personnel. The correct generator loss of stator coolant runback trip timer setpoint has been established for Unit 3. Procedure RT 5.40 "Main Turbine Runback Logic Functional" has been revised. The setpoint for Unit 2 has been verified to be properly set.

During the Cycle 8 refueling outage, a highly successful cleaning effort of the 2 inch bottom head drain line was completed on 12/1/91. In concert with General Electric Co., an inspection and cleaning evolution identified and removed metal shavings and other small parts that restricted flow through the bottom head drain line. The restriction was located in an approximately 2 foot portion of the drain from the Reactor Vessel down to the first elbow. Items recovered included metal shavings from a previous recirculation pipe replacement activity, a socket, nuts, a clamp, a washer, a swagelock fitting and a small bar.

Previous Similar Events

No previous similar events were identified.

ATTACHMENT 1 TO 9204270473 PAGE 1 OF 1

CCN 92-14050

PHILADELPHIA ELECTRIC COMPANY

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KEN POWERS
PLANT MANAGER

April 16, 1992

Docket No. 50-278

Document Control Desk
U. S. Nuclear Regulatory Commission
Washington, DC 20555

SUBJECT: Licensee Event Report
Peach Bottom Atomic Power Station - Unit 3

This LER concerns a Unit 3 Scram due to an electrical fault because of an improperly wrapped splice and deficient procedure, and violation of Technical Specifications due to not logging temperature indications. This revision concerns updated information involving a successful cleaning effort of the reactor bottom head drain.

Reference: Docket No. 50-278
Report Number: 3-90-003

Revision Number: 01
Event Date: 03/06/90
Report Date: 04/1-6/92
Facility: Peach Bottom Atomic Power Station
RD 1, Box 208, Delta, PA 17314

This LER is being submitted pursuant to the requirements of 10 CFR 50.73(a)(2)(iv) and 10 CFR 50.73(a)(2)(i)(B).

Sincerely,

cc: J. J. Lyash, USNRC Senior Resident Inspector
T. T. Martin, USNRC, Region I

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